

## AUGMENTED REALITY CONTROLS FOR USER INTERACTIONS WITH A VIRTUAL WORLD

### BACKGROUND

[0001] Interacting with a virtual world requires a user control, which is typically provided by a game controller. A game controller is a device that provides inputs and commands to a game console, typically to control an object or a character in the game. The game controller may communicate commands to the game console or a computer by means of a wired or wireless communication. Typical game controllers are keyboards, mice, gamepads, joysticks, etc. However, sometimes these conventional game controllers are not readily available to users or are not compatible with a particular game system, and impede users' interactions with the game systems.

### SUMMARY

[0002] The present disclosure is directed to systems and methods for augmented reality controls for user interactions with a virtual world, substantially as shown in and/or described in connection with at least one of the figures, as set forth more completely in the claims.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0003] FIG. 1 shows an exemplary system providing augmented reality controls for user interactions with a virtual world, according to one implementation of the present disclosure;

[0004] FIG. 2 shows an exemplary environment including the system of FIG. 1, according to one implementation of the present disclosure;

[0005] FIG. 3 shows an exemplary environment including the system of FIG. 1, according to one implementation of the present disclosure;

[0006] FIG. 4 shows an exemplary environment including the system of FIG. 1, according to one implementation of the present disclosure; and

[0007] FIG. 5 shows a flowchart illustrating an exemplary method of providing augmented reality controls for user interactions with a virtual world, according to one implementation of the present disclosure.

### DETAILED DESCRIPTION

[0008] The following description contains specific information pertaining to implementations in the present disclosure. The drawings in the present application and their accompanying detailed description are directed to merely exemplary implementations. Unless noted otherwise, like or corresponding elements among the figures may be indicated by like or corresponding reference numerals. Moreover, the drawings and illustrations in the present application are generally not to scale, and are not intended to correspond to actual relative dimensions.

[0009] FIG. 1 shows an exemplary system providing augmented reality controls for user interactions with a virtual world, according to one implementation of the present disclosure. System 100 includes computing device 110, virtual world displaying device 160, a projector, such as augmented reality projector 162, monitoring device 170, display surface 180, and physical objects 181a . . . 181n. Computing device 110 includes processor 120 and memory

130. Processor 120 is a hardware processor, such as a central processing unit (CPU) used in computing devices. Memory 130 is a non-transitory storage device for storing computer code for execution by processor 120, and also storing various data and parameters. Memory 130 includes virtual world 140 and augmented reality application 150.

[0010] Virtual world 140 may be a video game, an open-world video game, a sandbox game, or any other interactive digital application, and may include various settings, locations, characters, etc. In some implementations, virtual world 140 may be a virtual environment for users to interact collaboratively or competitively. Virtual world 140 may include virtual elements, such as virtual characters, virtual tools, virtual buildings, virtual vehicles, and may include an environment for virtual activities, virtual interactions, and/or virtual competitions.

[0011] Augmented reality application 150 is an executable computer code for user interaction with virtual world 140. Augmented reality application 150 may be used to combine real-world environment with virtual world 140 to create an augmented reality environment. For example, augmented reality application 150 may incorporate physical objects, such as physical object 181, in the real world into virtual world 140, or augmented reality application 150 may augment physical objects in the real world, such as physical object 181, with virtual elements of virtual world 140.

[0012] Object monitoring module 151 is an executable computer code for monitoring physical objects in an augmented reality environment. In some implementations, object monitoring module 151 may monitor a physical object or a plurality of physical objects, such as physical object 181. Object monitoring module 151 may monitor a position of physical object 181 in the real world and/or a position of physical object 181 in the virtual world corresponding to the real-world position of physical object 181. Object monitoring module 151 may monitor an orientation of physical object 181, such as a direction physical object 181 may be facing. In some implementations, object monitoring module 151 may track physical object 181. Tracking may include periodic or continuous monitoring of a position and/or orientation of physical object 181 in a two-dimensional or three-dimensional space. Object monitoring module 151 may monitor and/or track the motion and velocity or change in the motion and the velocity of an object in the real world, such as physical object 181.

[0013] Virtual world displaying device 160 may be a projector for projecting virtual world 140 onto display surface 180. Virtual world displaying device 160 may be a light emitting diode (LED) projector, a liquid crystal display (LCD) projector, a digital light processing (DLP) projector, or any other type of projector suitable for projecting a virtual world onto display surface 180. As shown in FIG. 1, virtual world displaying device 160 is located below display surface 180 and underneath physical objects 181a-n are situated. Such a rear-projection arrangement may allow a user or users to interact with physical object 181a-181n without having any shadows interfering with the projection of the virtual world onto display surface 180. Virtual world displaying device 160 may be located above display surface 180 or to a side of display surface 180. In other implementations, virtual world displaying device 160 may display virtual world 140 using a non-projection device, such as an LED or LCD displaying device used in televisions and computer displays.